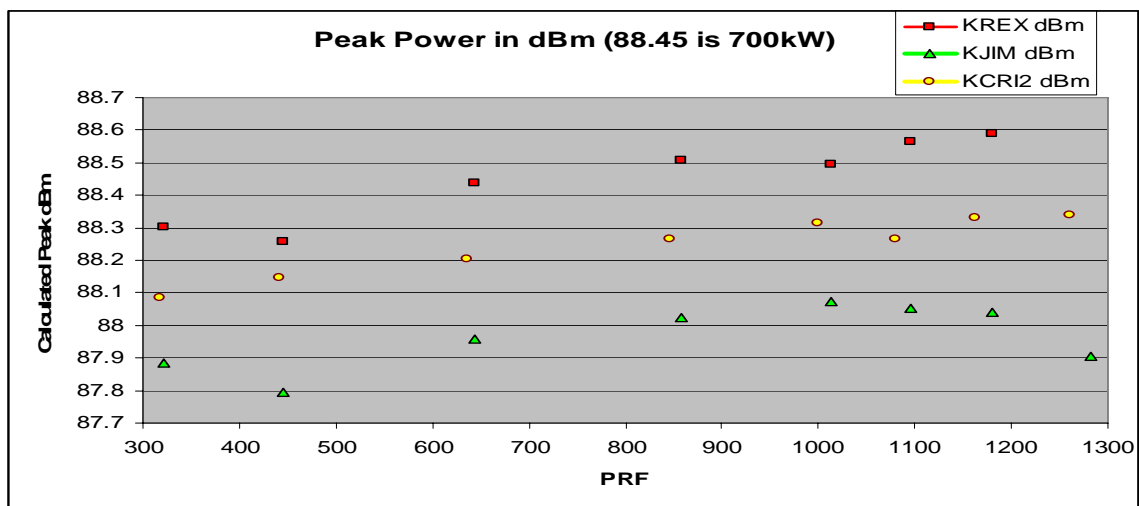


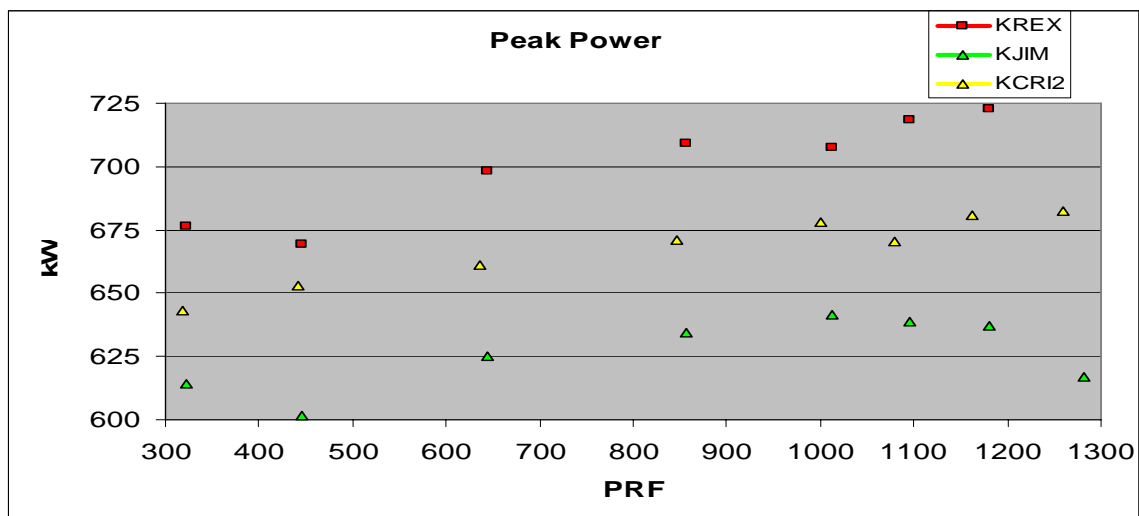
## Measuring Peak Power with an Average Power Meter

Operationally, peak power measurements are done in PRF 1, during the surveillance scans in the split cuts. Historically, PRF 5 is used off-line in short pulse to calibrate Peak Power so the duty cycle is roughly equivalent to the duty cycle in long pulse for PRF 1. The assumption made is that power meter measurements made at PRF 5 (approximately 1013hz, Duty Cycle of -28.31dB) are the same as power meter measurements made at PRF 1 (approximately 321hz, Duty Cycle of -33.16dB).

This is not a valid assumption. The chart below shows the variance in peak power measurements based on PRF when measured with an average power meter (it doesn't matter if it's the internal 4A26 power sensor or an external HP Power Meter, they both exhibit the same behavior).



The same chart in kW:



Difference in power between PRF 1 and PRF 5:

	KREX	KJIM	KCRI2
dB	0.194849	0.188762	0.228864
kW	31.03659	27.28438	34.81263

If you measure transmitter power for Short Pulse in PRF 5 and do the calculations to determine 700kW, you will get an approximately 30kW (0.2dB at 88.54dBm) difference from the same power reading at PRF1. When the online software (Operationally, RDASOT for legacy, and RDASTS for ORDA) determines the power (using PRF 1), you actually have an error of approximately 0.2dB in SYSCAL (or dBZ0 in ORDA). Because of the duty cycle difference, an average power meter does not measure the same average power at different PRF's for the same Peak Power signal. Using an average power meter, you cannot tell which reading is more accurate.

How does this create an error in measuring peak power? Let's take an example and see. First, the technician measures the power in PRF 5, and adjusts the klystron output for 700kW (88.45dBm) using that measurement. Now the technician uses the system software to adjust TR09 to report 700kW. However, since this measurement is done at PRF 1, the actual power measured is 0.2dB different than the measurement just taken, and TR09 is calculated to 700kW when the actual power measured came out to around 670kW.

To eliminate this inconsistency, always use PRF 1 to measure power on an average power meter.